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## FORESTRY PROBLEMS IN THE UNITED STATES

The United States is comparatively a young nation. The people of America, like many of their young men, have inherited vast wealth. One of the great social problems before us is how to deal with the vast fortunes so frequently left by the wealthy men of this country to their sons. The reason for the problem lies in the fact that these sons, never having learned the real value of money, are prone to squander their inheritances. One of the schemes adopted by wealthy testators to prevent this is to leave the estates in trust, the heirs to receive, not the principal but only the income to be derived from the investment of the principal. What has been done in the case of the individual seems about to be done in the case of the nation. The advocates of what has been designated as the "conservation movement" argue that our natural resources should be held in trust by the government for the use of the people. This movement, which seems to recognize the paternal function of the government, marks a new step in social development.

Until late in the nineteenth century, the resources of the United States were regarded as practically illimitable. Indeed, the forests were considered even as obstacles in the path of progress. It has been under the prevalence of these ideas that our customs and laws as to the use of the forests have developed; which accounts, in large measure, for the difficulty experienced in passing or enforcing regulations seeking to correct the wasteful habits of our people in the use of the forests. Forestry experts have been constantly engaged for more than a quarter of a century in an endeavor to change the habits of the American people from forest devastation to forest preservation, but the progress has been slow and accompanied by a great deal of tribulation. It is easy to see, however, that bad economic habits are as hard to correct as bad moral habits. The spendthrift is as hopeless as the morally dissolute. Neither is likely to make any serious attempt to reform until he begins to feel the consequences of his folly brought home to him. Mere ex-

hortation and entreaty may elicit promises, but the most effective cure for extravagance will always be poverty. The pity is that the injury is so often irreparable. The true conservationist wants our spendthrift nation to correct its foolish ways before all its inheritance is exhausted and while there is enough still left to ensure a comfortable living from the income.

So it happened that the question of conservation has been brought to a crisis by the rapid destruction of the forests and the consequent waning of the supply of merchantable lumber. We have been told by lecturers and writers of the fate which has befallen other nations that have wasted their national resources; we have heard how in the warm countries of Southern Europe the people suffer more with cold than in America with its more rigorous climate, because fuel is scarcer there; we have learned, through the newspapers and the frequent calls for contributions by the Red Cross and other benevolent societies, how in India and China famine every now and then sweeps over the land and visits its scourge upon the people because the soil is worn out or has been washed away by floods, and food is scarce in consequence. But India, China, or even Italy, are far away, and to a large extent the force of the lesson is dissipated. We have gone on wasting wood and robbing the soil of its fertility as unconcernedly as before.

Two reasons, perhaps, have existed which have prevented mere appeal from influencing our national habits toward greater frugality. The first is that we have so much that it seems foolish to talk about the possibility of the exhaustion of our resources. The second is that the issue has been clouded by a misdirected appeal to "save the trees" instead of the saner idea of "use the trees, but use them wisely." The idea that trees are to be looked at only, and not to be used, is too much for the commercial Yankee. He sees in the forest a source of profit to be exploited and vast quantities of material fit for practical use. He wants to use it and to profit therefrom, and he is right in wanting to do so. The forests are given us to use. The only thing we need to correct is our manner of using them.

Now let us see whether there is any ground for the oft-repeated assertion that the supply of timber is in imminent danger

of exhaustion unless we devise some plans of using it more carefully. The original forests of the United States were unequalled anywhere in the world in extent and value. They covered approximately a billion acres. Not only were they remarkable for their extent, but the trees which composed them were of types that produce lumber better suited for commercial purposes than those of any other forests in the world. As a consequence, not only have we used lumber freely and lavishly for our own needs, but we have exported large quantities each year to supply other nations. Now, after a century and a half, there remains of the original forests about sixty-five per cent only, and the demand for lumber is steadily increasing in spite of the substitutions of other materials, such as iron and cement, for many purposes for which lumber was formerly used. We are to-day taking material from the forest over three times as fast as it is being reproduced by growth. Some of the areas formerly the centres of great lumbering activities have already been practically depleted of their stock of merchantable timber and the lumbermen have been forced to seek other fields of operation. This is notably true of the regions about the Great Lakes. In 1880, Michigan produced twenty-three per cent of all the lumber used in the United States, but in 1907 she produced only four and one-half per cent. The great lumbering centres have shifted to the far northwest and to the pineries of the Southern States. White pine used to be the chief commercial timber of the country, but with the exhaustion of the better forests of the Lake States, other woods, even some formerly thought worthless, are being put upon the market instead. A Western lumberman told me recently that he did not think he had a stick of genuine white pine in his yard.

This rapid consumption of our forests is due to two causes: use and waste. Use of the forests is legitimate and necessary. Waste is, to a large degree, illegitimate and unnecessary. The great problem of the forester is to direct the use of the forests so that the future supply will not be curtailed, and at the same time to prevent unnecessary waste. A large percentage of the resources of the forest are never utilized in any manner. The waste begins before the trees are even cut and con-

tinues through all the operations of logging, milling, and construction until finally the timber, as it is put in the place where it is intended to remain in permanent use, is lost through decay or other cause.

In the forest, probably the greatest loss is due to the fires which consume millions of feet of standing timber annually. The last report of the Forester shows a loss during the year 1909 in the National Forests alone of one hundred and sixty-nine million board feet. The actual consumption of timber is not the only damage forest fires do, for they check the potential value of the forest by killing the growing trees and injure the soil by eating out the vegetable mould which enriches the forest floor. Then, too, the burned areas are restocked naturally by inferior species first. The fire problem is one which early confronts the forester. Fires cannot, perhaps, be entirely prevented, but they can be checked, and if proper methods are adopted they can be rendered less destructive. The forest fire problem will be largely solved when every lumberman is required to clean up and burn his slashings in the proper manner, when locomotives and lumber mills are equipped with spark-arresters, when campers are required to extinguish fires before leaving them. Then, too, permanent fire-breaks must be constructed and an effective patrol system established, such as the Forest Service is trying to establish through its rangers on the National Forests. But the force must be adequate, which is not the case on the National Forests at present.

Another natural cause of loss in the forest is due to the fact that many trees in the forest become overmature and subject to attack by insects or decay before they are utilized by man. It is estimated that in the Rocky Mountains over two hundred million acres include mature forests in which the loss by decay fully balances the increase due to new growth. Such forests are further damaged by insects, such as bark borers and beetles of various sorts. The forester recognizes not only the necessity of utilizing the mature timber in the forest and leaving the young trees to grow, but he also seeks methods of preventing insect attacks. Of these methods, a novel and effective one is found in the pro-

tection of birds, such as some species of woodpeckers, which feed upon these insects.

The most startling waste of wood occurs, however, not through natural causes such as these, but through man's failure to utilize completely that which he takes from the forest. It is estimated that, as compared with the standing timber, less than three-eighths of it goes into the manufactured product. Of course, some of this is "loss" rather than "waste," but much of what is now loss could be prevented if the newer and improved methods of working were introduced. It is one of the problems of the forester to devise new schemes to prevent this loss and to urge their adoption by the lumber trade.

The ordinary lumberman looks upon his holdings of timbered land as a speculation. His aim in working the property is to realize as great a profit on it as quickly as possible. He therefore cuts only the best trees and those most readily gotten out. If the log is injured in felling, or contains defects which make it unfit except for an inferior grade of lumber, he is likely to leave it in the forest to rot on the ground. The stump he cuts high, so as to lessen the labor and make sure that the log is regular in shape. He takes from the log only that part that is free from knots; hence not only is the limby top frequently left to rot, but it also, when dry, adds to the inflammability of the forest, thus increasing the danger from fire. Few lumbermen care anything about the future of the forest from which they cut their timber, hence no care is taken to protect the young trees from injury when felling the mature ones, and the idea of leaving a few of the mature trees of the desirable species as seed trees to ensure proper reproduction of the cut-over lands seldom occurs to the tree-cutters. All these new-fangled ideas—the conception of the forest property as a long-time investment rather than a short-time speculation—are the introductions of the forester. They promise much for the future of the lumber industry, in spite of the fact that at the present time such methods are practised on only about one per cent of the forest lands in the hands of private owners. The Forest Service is observing these principles, however, on the National Forests, and gradually the big lumber companies are beginning to see

the necessity of conserving the resources of their holdings if they are to continue to prosper.

But another set of problems present themselves even after the log is out of the forest and started on its way to the mill. If the transportation is effected by water, as is frequently the case, many logs become water-soaked and, sinking, are thus lost. If they reach the mill safely, much of the wood they contain is lost in the milling. For example, the beams or boards must be cut to certain dimensions, and the bark and slabs from the sides of the log go to the refuse pile to be used, if at all, only for firewood. Then each cut of the saw tears out a kerf considerably wider than the thickness of the saw blade. Many of the more modern mills have now installed the thinner-bladed band saws instead of the circular saws, which must necessarily have thick, strong blades, but even with the band saw a great deal of sawdust is produced. Another source of loss is in the fact that the arbitrary requirements of the lumber trade dictate certain standard lengths, in which lengths only the boards will be handled. Did you ever go to the lumber yard for a piece of timber 11 feet long? Or 13 feet long? You would have to buy a 12-foot or a 16-foot board and saw it down to the length desired. The short piece which you cut off was wasted. Thus the lumberman must cut down his logs to conform to these standard lengths, and the end pieces are wasted. A movement has recently been inaugurated among the lumber dealers of the Western Coast to encourage the utilization of odd lengths of lumber.

Altogether, it is estimated that, while passing through the mill, the loss in wood amounts to nearly fifty per cent. This can be offset to a degree by the proper utilization of the refuse in the manufacture of by-products. The government has recently equipped at Madison, Wisconsin, a Forest Products laboratory, a part of the work of which will be to develop methods of utilization of these waste bits of the log. For example, experiments are being made constantly in the utilization of sawdust and slabs for the manufacture of wood pulp for paper production. Much of this waste wood is also being distilled, and thus turpentine and wood alcohol and other fluids valuable in com-

merce, otherwise a complete loss, are obtained without the necessity of cutting new trees.

Improved methods are also being devised to eliminate waste in other forms of wood utilization. In the so-called "sulphite" method of wood pulp manufacture much of the sulphur used is lost. There is no way yet discovered to save it, though doubtless some plan will ultimately be found. Likewise, in the burning of charcoal, valuable gases, containing materials such as creosote and wood alcohol, are permitted to escape. These will some day be reduced and saved.

Another thing which promises much for the preservation of the forests is the recent development of methods of wood preservation by chemical treatment. If such treatment were given to all the timber used, it would probably effect a saving annually of about seven billion feet of lumber, or reduce the consumption yearly by about twelve per cent. Not only will preservative treatment prolong the life of a timber in use, but it renders possible the use of inferior species where formerly only the best, most durable kinds of lumber could be used. For example, the railroads are able to use treated loblolly pine cross-ties where oak was once required. This problem of preservation of timbers is also one the forester seeks to solve, and much success has attended the efforts of the scientists along these lines.

Besides these problems of how to use the forest and its products properly, there is another which the forester must work out; and that is, how to make the non-agricultural lands of the United States productive. This problem falls largely to the forester because trees are a crop that can be produced with profit on land unsuited for farming. Consequently, on the rocky slopes of our mountains and on other areas where only trees will grow, reforestation must ultimately solve the problem of how to make them productive. As yet, not much can be done along this line except by the National Government in an experimental way, and its endeavors in this direction have not been extensive. Private owners, except in woodlots, have scarcely begun to plant trees. Tree planting as a commercial enterprise has hardly been a profitable undertaking, but as a sign of the times it may be noted that some mining companies



have established plantations for the production of mine timbers, while some of the railroads have followed a similar plan to ensure a supply of cross-tie material.

All things considered, the forestry problems in the United States might be summed up as the problem of ensuring an adequate timber supply for future use. Wood will always be a necessity; and the present generation owes it to future generations to see that the supply of this necessity is not curtailed. The United States must, as to its future supply, rely on its own production. The tropical countries contain vast forests, but the woods are chiefly the hardest of hardwoods, unsuited to commercial uses. At present, the only nations besides the United States that export lumber are Russia, Austria-Hungary, Sweden, and Norway. In view of this, it will readily be seen why the movement for national control of a reserve area of our forests has been necessary. A government has providential functions as well as current ones, and in the management of its forests the government needs to be even more paternal than a private citizen would be in regard to his own affairs, for the reason that the destruction of the forests is felt more by the community than by the individual who works the injury. The private citizen may use his private property as he pleases, in general, but where his use of it conflicts with the general good, his rights are tempered by his obligation not to use his property so as to injure others. Governments are instituted to enforce the obligations of citizens. Then, too, the long time required to develop a forest deters private individuals from either forest production or forest protection in so far as it means conservative lumbering. It requires a large degree of civic morality to make a lumberman put the good of others ahead of his individual rights as a property holder. Consequently, the leadership in matters of forest conservation—in fact, the solution of the forestry problems which confront our people—lies largely with the National Government.

EDWIN R. JACKSON.

U. S. Forest Service.